SOLUTIONS FOR SPRING CUP MATHEMATICAL OLYMPIAD (P3)

Questions 1 to 7 are worth 4 marks each.

1. There are 25 more girls than boys in the class last year, after 80 boys and 65 girls joined the class this year, do we have more girls or boys in the class now? How many more?

Answer: _____; _____

Solution:

There are 80-65=15 more boys who joined. So there are still more girls.
25-15=10.

2. Lily's home is 450 meters away from school. One day when Lily was heading to school, after walking 90 meters, she realised that she forgot to pack her assignment. She went back home to take her assignment, then went to school. What is the total distance Lily travelled?

Answer: _____

Solution:

450+90+90=630

3. Wong's exam result is placed 26^{th} among his class if we start counting from the 1^{st} place. If we start counting from the last place, he is also the 26^{th}. How many students are in his class?

Answer: _____

Solution:

26+26-1=51

4. A wooden stick is 24 cm long and a carpenter wants to cut it into 4 equal pieces. If each cut takes 3 minutes and he needs to rest 2 minutes for every cut, how much time does it take?

Answer: _____

Solution:

The carpenter needs to cut three times to cut four sections, and does not need to rest after the last cut, so only needs to rest twice.
$3\times3+2\times2=13$

5. If there are five weekends in June, then June 1 is _____.(The answer range is Monday to Sunday)

Solution:

There are 30 days in June.

$30\div7=4R2$

So, the remaining two days must be weekends. Since the weekend is followed by Monday, this weekend can only be at the beginning of the month. That is to say, June 1 is Saturday.

6. Alice is 5 years older than Brandon; Brandon is 2 years older than Carla; Carla is 4 years older than David. Among them, _____ is the oldest and _____ is the youngest. The oldest is _____ years older than the youngest.

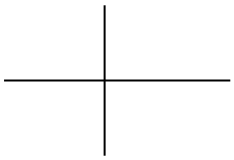
Solution:

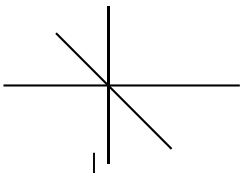
The oldest: Alice
The youngest: David
5+2+4=11

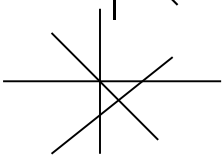
7. Alex and Ben were playing on the beach. They used a stick to draw several straight lines on the sand. Alex's goal was to have as few intersections as possible on the lines he drew while Ben's goal was to have as many intersections as possible on the lines he drew. Now, they begin with Alex drawing the first line, then Ben, then Alex, then Ben. They drew a total of 4 lines. There is a total of _____ intersections.

Solution:

Alex: ——————

Ben: 

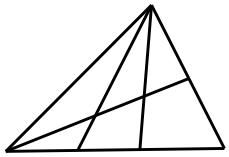
Alex: 

Ben: 

4

Questions 8 to 14 are worth 6 marks each.

8. There are_____ angles. (Only angles smaller than straight angle are considered)



Solution:

 : 3+2+1=6

 : 2+1=3

 : 4

 : 4

 : 2

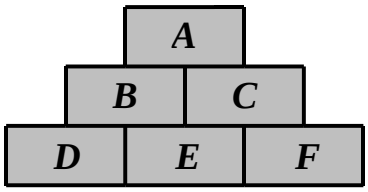
 : 2

 : 2

 : 1

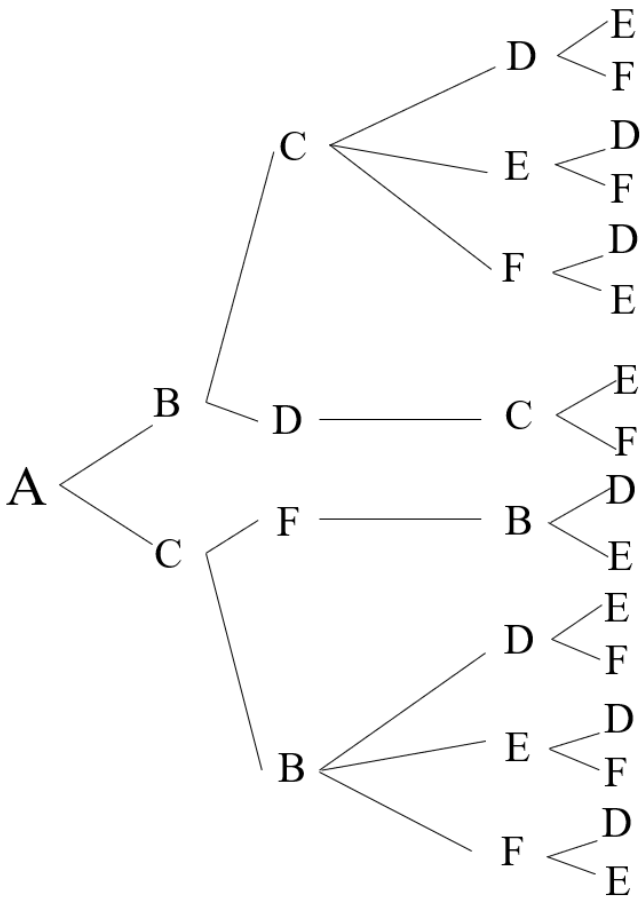
Total：6+3+4+4+2+2+2+1=24

9. There are 6 bricks placed as shown in the figure. A brick can only be removed when there is no brick above it. Alex wants to take away all the bricks. How many different ways are there to remove the bricks?



Answer: _____

Solution:

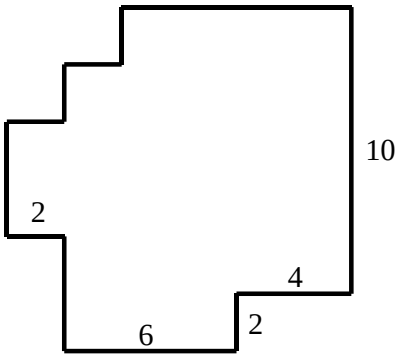


Answer: 16

10. There are some chickens and rabbits in a cage with 50 legs in total. If we replace every chicken with rabbit and every rabbit with chicken, there are 52 legs in total. There are _____ chickens and _____ rabbits.

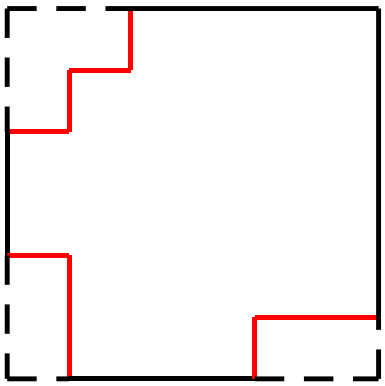
Solution:
If the number of chickens and rabbits is the same, the number of legs will not change. So there is one more chicken than rabbit.
Rabbit: (50-2) ÷ (4+2) =8
Chicken：8+1=9

11. What is the perimeter of the figure below?



Answer: _____

Solution:
Turn it into a regular shape by moving the edge.



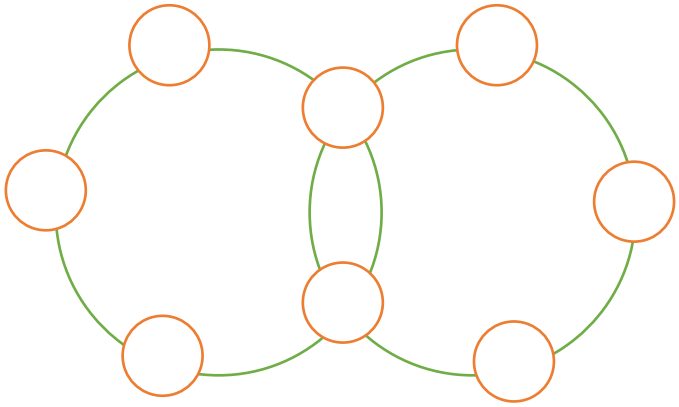
10+2=12
4+6+2=12
12×4=48

12. Fill in the boxes below such that it satisfies the calculation.

$$\begin{array}{r} \square\ \square\ 2\ 3\ 7 \\ -\quad \square\ 6\ \square\ 6 \\ \hline \quad\quad\ \square\ 8\ \square \end{array}$$

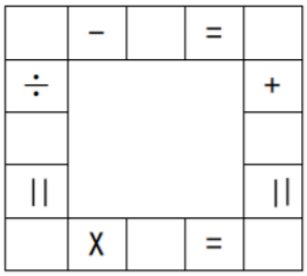
Solution:
Ones digit, 7-6=1, so fill in 1.
Tens digit, 3-box=8, so it's 13-box=8, fill in 5.
Hundreds digit, 12-1-6=5, so fill in 5.

13. Use the numbers 2, 3, 4, 5, 8, 10, 11, 15 to fill in the small circles below such that the sum of the numbers lying on each large circle is 34. (Just fill in one of the possible answers)



Solution:
The sum of all numbers: 2+3+4+5+8+10+11+15=58
The sum of two circles: 34+34=68
Difference: 68-58=10
So the sum of the two numbers at the middle is 10.
So fill 2 and 8 at middle.

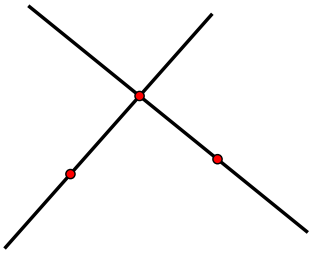
14. Using numbers 1 to 8 without repetition, fill in the 8 empty squares in the figure below such that it satisfies the calculations on each side of the square.



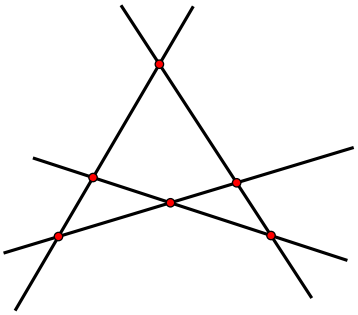
Solution:
Give priority to multiplication and division because it can only be $2 \times 3=6$ or $2 \times 4=8$. Therefore, the lower left corner can only be 2, and then fill in other boxes in turn.

Questions 15 to 19 are worth 8 marks each.

15. If the following figure shows that three trees are planted into two lanes and there are two trees on each lane. How to plant 6 trees into 4 lanes such that there are 3 trees on each lane? (Draw out the diagram)



Solution:



16. We have a rectangle and a square with equal perimeter. The length of the rectangle is 10 m. The width of the rectangle is 2 m shorter than the length. What is the area of the square and rectangle respectively?
Solution:
Width: 10-2=8
8×10=80
Side length: (8+10)÷2=9
9×9=81

17. Given that: 2#4=8, 5#3=13, 3#5=11, 9#7=25.
Calculate: 7#3.
Solution:

$7\times2+3=17$

18. Alex, Ben, Cedric and Diane have a total of 17 sweets. They had the following conversation:
Alex said to Ben: "If I give you 1 sweet, we will have the same number of sweets."
Ben said to Alex: "If you give me 2 sweets, I will have 3 times as many sweets as you."
Cedric said to Alex: "If I give you 3 sweets, you will have 3 times as many sweets as me."
Diane said to Alex: "If you give me 4 sweets, I will have 4 times as many sweets as you."
It turns out that, those with an odd number of sweets were correct while those with an even number of sweets were wrong. Given that Alex, Ben, Cedric and Diane have A, B, C and D number of sweets respectively, what is the four-digit number $\overline{ABCD}$?

Solution:
3158

19. Alex and Ben put 3 different numbers in the boxes. Alex selects a number and Ben selects a box to fill in. Alex wants the difference to be as large as possible, and Ben wants the difference to be as small as possible. Both of them follow the best strategy. What is the difference?

$$\begin{array}{rcccc} & 2 & 0 & \square & \square \\ - & & 2 & 2 & \square \\ \hline \end{array}$$

Solution:
1854

Questions 20 is worth 10 marks.

20. In your opinion, from question 1 to 19, your favourite question is question _____, the most difficult question is question _____. (As long as your answer is within 1 to 19, you get full marks, otherwise you get zero.)